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Gloves and Ebola virus: a consideration of the penetration possibility based on nanostructure consideration

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To the editor,

Ebola virus infection is the new deadly viral infection that is presently problematic in many countries in Africa. The prevention of this disease seems to be difficult and the rapid distribution of disease becomes the important issue for further discussion. As noted by Muyembe-Tamfum *et al.*[1], one of the major disease control measures is the distribution of protective equipment to health care workers. Gloves are important protective equipments that are widely used. In fact, gloves can avoid direct contact to body fluids from the patients. Muyembe-Tamfum *et al.* noted that “human-to-human transmission is associated with direct contact with body fluids or tissues from an infected subject or contaminated objects[2]”. Hence, gloves become extremely important protective tools. However, the important consideration is on the effectiveness of gloves for prevention of Ebola virus. Focusing on the nanostructure of gloves, there are numerous pores. Based on nanomedicine principle, the pore size in protective equipment is an important factor determining the effectiveness of the tool[3,4]. Basically, the pore size must be smaller than the viral particle size for prevention of viral transmission thorough the protective barrier[3,4]. Focusing on the case of Ebola virus, its diameter is about 80 nm. For the gloves, the pore size is about 5 micron or 5000 nm. Comparing Ebola virus size with glove pore size, it is possible that the virus can directly pass thorough the gloves pore to the hands of the users. Hence, it seems that using gloves might not be an effective tool for prevention of Ebola virus.

One might argue that there are several factors to be considered in Ebola virus infection process. That argument is correct but the present finding, based on nanostructure consideration, it can at least show that the virus can pass thorough the gloves and can be further problematic. In the present crisis, there are many cases of Ebola virus infections among the medical personnel who care the patients. The hereby finding might be an explanation for the mentioned observation.

Conflict of interest statement

We declare that we have no conflict of interest.

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